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Difficulties Arising in the Installation of Cost Systems

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(Before Montreal Chapter, October 23, 1930.)

WHEN I was requested to speak to you on the difficulties of installing cost systems I protested that it was not a very cheerful subject. However, I hope to dispel some of the gloom caused by these difficulties by trying to show how they may be solved and the results that will follow the establishment of a proper cost system interlocked and operating with a budget system.

In analyzing the difficulties which are generally encountered in the installation of cost systems, let us suppose that we wish to establish a system of standard costs as this form of cost accounting is evidently growing in favor in modern industry.

Standard Costs

Standard costs may be defined as costs that may be attained under favorable conditions. They are actual costs to the extent that the variations between actual material, labor and overhead costs and estimated costs are absorbed monthly through the Profit and Loss Account. Standard costs are a standard by which to measure accomplishment and provide an incentive to still greater accomplishment. The ultimate aim of standard costs is to have them so exact that the details of ascertaining actual costs can to a large extent be eliminated.

Let us assume that we have been retained to establish a system of standard costs in a company where the complexity and number of lines manufactured make it necessary to obtain a great mass of detailed information. Let us further assume that we are employed by a large creditor to make a survey of this business, which is directed by a somewhat old-fashioned management. The company has been losing money for some time and the management, for want of proper and adequate information, cannot discover where the weakness lies. There is no intention of changing the management, but it is nevertheless very lukewarm about establishing a standard cost and budget system, and doubtful to its possibilities. As soon as we enter the plant a survey should at once be made somewhat along the following lines:

Existing Cost Systems

The existing cost system should first be examined to consider to what extent the following should be modified or replaced:—

1. Classification of the products in the various departments of the factory and the manufacturing processes of each department.

2. The factory orders used and the method of starting work in the various departments.

3. The method of handling raw materials, the organization of the store-room and the detailed material reports in use.

4. The method of paying wages, the reason for its adoption and the labor reports in use.

5. The items composing factory and general overhead: how factory overhead is distributed in the various departments; and the various forms used for this purpose.

6. Methods of reporting production and compiling detailed cost sheets and the other cost records in use.

General Accounting Records

The general accounting records should be carefully examined to see whether the introduction of new forms would save time and simplify the tabulation of the required information. A study should also be made of the statements, if any, that are prepared monthly for the management and an analysis made of the results obtained from these statements.

A very careful study of all the expense accounts should also be made. Many manufacturing companies are handicapped by unnecessary expense which is often due to pet hobbies of the management or because they are clinging to out-of-date and wasteful methods. On the other hand, some firms handicap themselves by not incurring proper expenses. To eliminate expenses simply because no immediate return can be seen often seriously lessens the efficiency of the plant. It is useful, therefore, at the outset to make clear which expenses are necessary and useful and which are not.

Sales Department

In the sales department the following points should be looked into:—

1. How is the product sold, how much is sold annually and is the business of a seasonable nature?

2. Are branch warehouses, offices, or agencies maintained, if so how are they handled?

3. Is there a large mail order business, and if so under what plan?

4. The names and territories covered by all the salesmen and their length of service with the firm. Details of their remuneration; are they paid a straight salary or commission and what arrangements are made regarding advances to them?

5. Is advertising done under the supervision of the sales manager or through an agency, and what is the annual appropriation?

6. The filing system: the follow-up system and all available information regarding freight rates, routing, etc.

7. Information regarding the sales office salaries and their duties; copies of the forms of books in use including rate lists, salesmen's reports, expense accounts, quotation records and information regarding profits shown by the various salesmen in their territory, etc.

8. Is there co-operation between the sales department and the cost accounting department with a view to establishing correct selling prices?

Plants

A careful examination should be made of the plant or plants somewhat along the following lines:—

1. Is more than one plant in operation and if so where located? The appraisal is useful because it will contain a description and blueprints of the layout of the plant.

2. Is the plant owned or rented, and if rented what is the term of the lease?

3. Is the machinery properly laid out to obtain the maximum of production?

4. Is a maintenance and plant record kept of the various buildings and machinery? This will show the repair bills, production costs, etc.

5. Do the factory superintendent and the foremen appear competent? Do the foremen work themselves or are their duties merely supervisory?

6. Are stores issued to the foremen of the departments by a store-keeper under written authority or do the foremen and laborers help themselves from the storeroom without making any record of what they have taken?

7. Is there a separate tool-room and if so what is the method of keeping track of tools once they have been issued to workmen?

8. What sort of power is employed? If power is purchased is it on a meter rate or on a contract basis?

9. Are working conditions in the plant conductive to good work on the part of the workmen? Are there any facilities for the welfare of the employees such as recreation rooms, dining rooms, athletic societies, etc.?

10. Does there appear to be a close inspection of the product by competent inspectors?

11. Are standards set for the foremen of the different departments? Does everyone appear to be on his job or is there any friction and dissatisfaction in the departments?

12. What sort of packages are used to pack and ship the product and are these made on the premises or purchased outside? How many employees are there in this department and what are their duties? Are there proper mechanical appliances to pack and ship the product with the maximum speed and minimum expense?

13. How are shipments made; what records are kept to see that nothing is shipped out without being billed? Has the company their own railway siding or is it necessary to truck their product to railway stations and if so is it trucked by their own trucks or by outside carters?

14. How many employees are there in the estimating and planning departments? How are their estimates made and is there close co-operation with the cost, sales and other departments of the organization?

15. Does the purchase department make the purchases by verbal or written requisition, and is there one responsible party in charge of purchasing? Before purchases are made are quotations from a number of different firms received? Does the purchasing department give due regard to the quality of the merchandise to be supplied by each firm and is it well informed on freight rates, duty, etc.?

16. How is the receiving department organized? How are incoming goods handled? What record is kept of shortages and how are partial shipments checked up and reported? What co-operation is there between the purchasing department and the storeroom?

17. Is a storeroom maintained for materials and parts, and if so, where is it located? Are the stores under the supervision of a storekeeper or has everybody access to them? Are they well laid out with mechanical equipment such as trolleys, shelves, bins, racks, etc., so that materials may be handled with a minimum of cost? Are parts manufactured and carried in stock and if so could they be purchased outside more cheaply than they can be made? Is there a close check on all materials received, and does the storekeeper call and check carefully all goods received in order to satisfy the purchasing agent that he is paying for nothing which has not been taken into stock? Is obsolete and slow moving stock reported regularly to the management with a view to keeping it at a minimum? Are perpetual inventory records kept, and if so, do they show quantities only or values and cost as well? If there are returnable containers, how are they handled and accounted for? Are there arrangements to make periodical physical counts of different lines with a view to ascertaining whether they tally with the perpetual inventory records?

Preparation for Standard Cost System

A further examination should be made somewhat along the following lines in an attempt to establish the standard costs which are to be introduced:—

1. Sales Policy and Methods. These should be examined to determine the maximum sales volume obtainable. A change of advertising and selling methods often helps to reduce costs. Sometimes cost reductions make it possible to extend the sales territory, adopt new lines of products and discontinue other products which do not affect the sale of profitable lines and are themselves not profitable.

2. Is there to be any change in the capitalization of the business: for example, if capital stock replaces part of the bank loan the interest charges will be less.

3. A careful study should be made of the purchasing methods to see whether it has been the practice to buy in small quantities, when by buying in large quantities a considerable saving could be effected. Conversely, are goods purchased in large quantities which could be purchased equally cheaply in smaller quantities and smaller inventories carried? A stock of obsolete materials may be in stock which could be disposed of or used for some other purposes and interest and insurance charges thus reduced. Sometimes one material can be substituted for another and a saving be effected.

4. A careful study must be made of the factory organization and mechanical equipment, for these may affect costs. If the mechanical

equipment is not adequate and can be improved there may be a considerable saving in cost. Additional equipment at certain points or rearrangement of machinery may result in a considerable saving in the unit cost as well as a possible saving in the handling and transfer of material from one department to another.

5. Labor conditions should be studied with a view to increasing production and lowering unit cost by a change in the wage system such as the introduction of bonus or piece rate plan, while changes in working conditions or the provision of facilities for entertainment and recreation might be considered.

6. Even influences which are beyond control such as market tendencies and shortage of labor should be taken into consideration in determining standards. It should always be remembered that any attempt to decrease production tends to increase costs because fixed charges and other charges which are not incurred in proportion to production must be spread over a smaller number of units. This causes an increase in the unit cost.

Attitude of Management

When the survey is completed, very often the first difficulty which confronts us is to convince the management of its value, and to obtain their wholehearted co-operation in making the cost system effective.

Probably the best way to gain a favorable hearing would be to put before them an estimated statement of operations showing the estimated monthly profits for say a year in advance as compared to the losses sustained during the past year. This should have the effect of exciting their interest in the possibilities of the business and show them how the disastrous losses they have suffered may be stopped and a solution for their present difficulties. It is very important not to criticize ruthlessly every idea which the management in the past have put into effect, but wherever possible to applaud the commendable features in the plant or accounting system and by suggestion try to win their support to make the desired changes.

Assuming that we have been successful in obtaining the support of the management in our proposed plans, the next step is to obtain the co-operation of the staff, whom we will assume are hostile to us. The difficulties here will be to get the factory superintendent, the foremen, the cost accountant and the men in charge of the service departments, such as the engineer in charge of power plant, etc., to accept the idea. At first all of these men will probably instinctively dislike any change in the present methods and will feel that they will be unable to handle their work under the new conditions. They may even feel they may lose their jobs. The best way of gaining their confidence and co-operation would probably be as follows:—

(a) Discuss fully with them conditions as they are at present and find out what difficulties they are encountering in the administration of their department, and what suggestions or ideas they have for bettering these conditions. An approach of this sort nearly always wins their support as they feel that a sympathetic interest is being taken in their difficulties and that one really wants to co-operate with them in an effort to work these out.

(b) Suggest to them, of course after discussion and with the consent of the management, that if they be placed on a standard they will be paid a bonus for any saving that they can effect in their department as well as for increased production. It is extraordinary in some cases how much money can be saved and how production can be speeded up if the superintendent and the foreman see the figures of their performance each month, and are able to compare them with the previous month and with the standard which has been set for them. They are immediately interested in maintaining the maximum efficiency in their department in order not only to obtain the possible bonus, but to feel that the business is being more successfully conducted.

Dealing With Sales Department

We will next have to deal with the difficulty of convincing the sales manager and sales department generally of the advantages of the new scheme. They will at first undoubtedly think we are burdening them with a lot of red tape which will lead them nowhere, and they will probably not sympathize with any changes.

Almost invariably they can be won over by discussing with them carefully the troubles they are having in marketing certain lines and trying, if possible, to meet their request that certain new lines be introduced which will help them to acquire the newer volume expected from them. Sympathetic discussion with the sales manager and even possibly the salesmen will lead them to give new ideas as to the methods of setting commissions, distribution of sales territory, unit costs of sales and much other information that is very valuable to the management.

Other Personal Contacts

Another difficulty is to co-ordinate the various departments so that they make one smoothly running machine. When there is no adequate cost system in force it is generally found that there is no team-work between the purchasing department, the production department, the sales department and the general office staff. One of the best ways of developing this co-operation is to have frequent meetings at which the heads of all departments are encouraged to exchange their views and make suggestions which will help the business to function more efficiently. Some firms even give cash bonuses to any employee who makes a practical suggestion that is adopted and results in saving or increased production.

Another very practical difficulty is the rearrangement of personnel. Discussion with the various employees often discloses the fact that they are not particularly interested in the work they are doing but would be very valuable in another capacity. For example, the purchasing agent might be very much more profitably employed as a cost clerk. A bookkeeper doing routine work in the office may have a longing to become a storekeeper. These may seem trivial adjustments, but the success of an organization may be measured to a great extent by the fact that wherever possible the right man is working in the right place.

Let us assume that the whole organization from the president down has been won over to our scheme and that they are all keen on

establishing the proposed system. The battle is a long way from being won yet as we now pass from general difficulties into particular difficulties. Let us examine these in order and attempt to find the solution for them.

Records Required

The first difficulty is to put into effect an accurate system of recording the purchasing, storing and consumption of materials and supplies, and of obtaining accurate material costs. If we are unable to control materials our cost system is almost certain to be a failure and we are beaten before we start. To illustrate the importance of proper inventory control a few general remarks first are necessary.

The necessity for properly accounting for machinery, equipment and supplies used in a factory may be seen in the words of Mr. Samuel Vauclain, President of the Baldwin Locomotive Works, about a plant survey, when he said, "I illustrated this by throwing some money on the floor which the men all ran after to pick up. This explained very forcibly the fact that everybody would scramble to pick up money, but that nobody there seemed to have the slightest desire to pick up the machinery, tools and supplies lying all over the shop floor, each piece of which was more valuable than the money which I had scattered. They all saw the point at once and thought it was a good way to demonstrate the reckless manner in which they were handling things."

When capital is in the form of cash it is carefully protected and receipts and disbursements safeguarded. Its custodians are held to a strict accounting, but once this capital is converted into materials there is a tendency to become slack, and to lose sight of the value of the investment as well as to tolerate practices that are wasteful, inefficient and needlessly expensive. Unless materials are properly guarded and accounted for there will be waste which will reduce considerably the profits of a factory. Such waste may occur either through needless damage caused by the freedom with which material is made available, or by theft, which is made possible when material is left without proper supervision where it can be taken by any unauthorized person. Failure to keep adequate account of material results in the following:—

1. Inability to prepare accurate financial statements for lack of material inventory value.

2. Inadequate records of the consumption of materials used in the production of finished goods or in the operation of the manufacturing department.

3. Incomplete information as to the cost of the various articles or products manufactured.

4. Over-buying of certain lines of material involving the financial expense of carrying such inventories and resulting in obsolete or depreciated stock.

5. Shortage of necessary materials to keep production at maximum efficiency resulting in idle time and dissatisfied customers when deliveries cannot be made on time.

Advantages of Perpetual Inventory and Stores Control

The advantages of perpetual inventory and stores control are these:—

1. Properly devised it will keep at a minimum the company's investments in materials and supplies.

2. It will bring about the delivery of materials of the proper quality to men and machines in the right amount at the time they are needed.

3. It will provide for the scrutiny of materials purchased to see that they are in accordance with purchase specifications.

4. It will make for good factory housekeeping in that there will be a place for everything and everything will be in its place. Materials will be stored where they can be readily found and accessible for use, and protection will be assured against climate and other atmospheric conditions and, if fragile, against breakage.

5. It will make possible the preparation of profit and loss statements and balance sheet of the company.

6. It will provide means for control of cost of individual products, as materials are issued against orders only when authorized and thereby the cost department's records are protected.

7. Expensive and sometimes unreliable annual physical inventories will be largely eliminated. A perpetual inventory provides for the constant taking of actual stocks on hand by the perpetual inventory records in a businesslike and routine way. Errors are caught almost as soon as they occur. Theft or discrepancies in materials are revealed promptly. Slow moving and obsolete materials are brought to light. There is no waiting for the annual shut-down for stock-taking.

Difficulties in Treating Materials

The difficulties in treating materials may be summarized as follows:—

1. The difficulty of organizing the purchasing department, receiving department, storeroom and factory foremen all to work together to eliminate waste and obtain accurate results.

2. The difficulty of establishing a system whereby all transactions involving the purchasing, receiving, storage and consumption of materials is done with the knowledge of duly authorized and responsible officials.

3. The difficulty of having the storeroom properly organized so as to ascertain at any time the amount and value of each kind of material carried in stock, and so that all material not immediately required in manufacturing shall be stored in a safe place under proper supervision.

4. The difficulty of organizing a system so that the kind and amount of material used in the operations of the manufacturing departments in the production of any orders can be readily known and so that the accuracy of all cost and inventory accounts involving materials can be checked in total against the controlling accounts in the general ledger.

5. The difficulty of seeing that materials are carried in the production at the proper valuation so that the material cost may not be overstated or understated.

6. The difficulty of instituting a proper system of physical tests of various lines in the storeroom to see that these agree with the storekeepers' records and that no serious discrepancies exist.

These difficulties can be overcome by a carefully organized plan whereby each employee is instructed as to his duties and provided with the proper forms, equipment, and records necessary to execute them.

Problems With Labor

The next group of specific difficulties which we have to face are those dealing with the treatment of labor, and these may be stated somewhat as follows:—

1. The difficulty of seeing that the labor is properly organized in the various departments.

2. The difficulty of seeing that all the labor is competent and producing with a maximum of efficiency.

3. The difficulty of ascertaining whether or not the system of paying wages is a proper one or if another should be introduced.

4. The difficulty of educating labor to apportion their time properly on the various jobs in process, so that the labor costs may be accurately determined.

These difficulties can be overcome by telling the superintendent and foremen exactly what information is required from them and the employees, and by supplying them with the forms necessary to record this information most easily. The production may be speeded up possibly by applying a bonus system, by offering some incentive to interest the workers, or by improving working conditions in such matters as the rearrangement of machinery, better light and ventilation, etc.

Overhead

The next specific group of difficulties which we shall encounter deals with overhead. These may be summarized as follows:—

(a) The difficulty of classifying the different items of expense properly so that they may be carefully followed and distributed to the various departments.

(b) The difficulty of distributing the cost of the service department to the operating departments accurately.

(c) The difficulty of determining the best method of distributing the overhead; that is, whether it is to be distributed on a basis of prime cost, direct labor hours, direct labor cost or machine rate.

These difficulties can only be overcome by a careful discussion with the management and heads of various departments, so as to have a clear understanding of exactly what expenses are included in each item of factory overhead. When this information has been compiled the basis of its distribution must be determined by a careful study of the nature of the product manufactured and the various manufacturing processes involved. For example, if material is the main element

of production cost the material cost method may be the best means of distribution, or if labor is the chief factor it may be better to use the labor hour, or labor cost method of distribution.

Variation From Standards

The next difficulty to be considered is placing the responsibility for any variations from the standard set upon the employees at fault. This can be overcome by preparing an exact plan by which any errors or omissions can be readily or promptly traced. For example:—

1. Variations due to differences in the grades or quality of material may be the fault of the purchasing department or of the production department.

2. Variation in the quantity of material consumed, if of standard grade or quality, is the fault of one or more departments which processed the material.

3. Variations in labor cost due to differences in wage rates may be the fault of the employment department, if wage rates different from standard are paid, or of the production department, if the work was assigned to employees of a wage rate different from that contemplated in the standard.

4. Variations in labor cost due to differences in the time required may be the fault of the production department, if the work was done by a method different from that contemplated by the standard, or of the department foreman if more than standard time was used because of careless supervision or incompetent help.

5. Variations in the amount of applied manufacturing expense, given a fixed distribution rate, are due to differences from the standard for time in process and responsibility follows that for labor cost.

6. Variations in the amount of departmental expense, apart from fixed charges and apportioned charges, are placed in the same manner as material and labor costs.

7. Variations in the amount of production may be the fault of the production department, of department foremen, or of the sales department, according to the causes of the variation.

Consideration of the number of ways in which costs may vary from standards and of the different places in which responsibility may be placed makes it apparent that the correct use of standard costs require analytical ability of a high order. It is not sufficient to compare totals, as the difference between two totals may be due to a number of differences in the various elements which compose the totals. Nor is it sufficient to compare money values only, as differences in money values may be due to differences in quantities as well as unit rates. Any comparison with a standard, therefore, must be complete, and must take all details of the work into consideration if the variations between the cost and the standard are to be thoroughly understood.

Minor Difficulties

Other minor difficulties to be overcome are the treatment of:—

1. Defective and spoiled work.

2. Cost value of by-products.

3. Containers and packing costs.
4. Idle time and equipment.

The way to smooth out any problems arising from these items is to determine their exact relation to production and distribute any expense and loss incidental to them so as to overburden or underburden cost to the least possible extent.

Now, let us make the very optimistic assumption that we have surmounted all the serious difficulties and our cost system is successfully launched, and review the advantages that will accrue from the operation of our interlocked cost and budget system.

Advantages of the Cost System

The advantages of a cost system are:—

1. For Production Control—

(a) Establishment of accurate cost of producing each lot or kind of product and of operating each department.

(b) Establishment of standard costs as a basis of comparison with actual costs, and of standard of individual and departmental effectiveness.

(c) Periodical comparisons of cost and production with those of former periods or with the standards which have been determined.

(d) Records of variation from standards and of the causes of such variation.

(e) Suggestions for reducing costs.

(f) Closer control of materials and manufactured stock.

(g) Establishment of equitable wage rates.

(h) Reduction of spoiled work.

(i) Detection of losses of material, wasted time, poor supervision and various other leaks.

2. For Sales Purposes—

(a) Basis for estimating selling prices within the limitations of supply, demand and competition.

(b) Determination of profitable and unprofitable lines.

(c) Information on which to base advertising appropriation, commission rates, discounts and list prices.

(d) Increasing the efficiency of salesmen and enabling them to concentrate their efforts of energy on the more profitable lines.

(e) Establishment of correct selling prices with true cost as the basis.

3. For Executive Purposes—

(a) Presentation of monthly profit and loss statements and balance sheet.

(b) Basis of future financial requirements.

(c) Control of inventories by perpetual inventory system.

(d) Records of fluctuation in cost.

(e) Assistance in budgeting future expenses and sales requirements.

(f) Locating individual and departmental efficiency.

(g) Assistance in formulating and executing business policies.

Advantages of Budgeting

Manufacturers are now coming more and more to believe that they should incorporate as a part of their cost system methods whereby they may predetermine with reasonable accuracy their volume of sales, their production requirements, their cost of production, and most important of all, their net profits. In other words they are carrying a cost system farther and in an orderly way are predicting conditions for a reasonable period ahead. A good budget system will accomplish the following:—

(a) It will forcast the volume of sales. An accurate budget system shows the executive what may be expected in the line of business over the next few months, thereby assisting them in their sales department and in directing sales efforts. In addition to this the sales quota established by the budget system sets a goal to be reached by the sales department.

(b) It establishes a production quota. A budget system provides for the setting up of a production quota based on the estimated sales as a result of which the works manager may lay out production well in advance by specifying:—

1. The amount and kinds of material that will be needed.
2. The size and kind of working forces that must be provided.
3. The amount of overhead that will be expended.
4. The requirements in machines and equipment.

(c) It assists the purchasing agent by enabling him to negotiate purchase contract orders to the best advantage with accurate knowledge of requirements and markets.

(d) It makes it possible to establish a consistent labor policy with respect to the employment and education of working forces, and when made necessary by an anticipated reduction in business allows the scaling down of the forces intelligently and with due ragrd to the rights of the workers.

(e) It points out financial requirements to the executive by estimating the necessary cash requirements of the business, indicates the probable condition of the accounts receivable and accounts payable, and in general acts as a compass for steering the finances of the business.

(f) It will set a definite goal of achievement for all departments. Conscientious executives will strive to achieve this goal and in so doing will increase net income. The purpose of the budget will thus be fulfilled. More universal adoption of budgets, regardless of the size of the industry, will contribute to business prosperity.

Advantages of Cost System Combined With Budget

Having now reviewed independently some of the advantages of a good cost system and a good budget system, let us examine the merits of the two, interlocked and operating as one.

These advantages may be summarized as follows:—

1. A monthly profit and loss statement compared with the estimated condition as revealed by the budget.

2. A monthly balance sheet showing the actual condition of the various assets and liabilities set off against the estimated conditions.

3. A monthly or perhaps more frequent comparison of actual costs of products with a standard or budgetary cost.

4. A monthly or perhaps more frequent comparison of operating costs and overhead expenses with standard or budgetary allowances.

The advantages to an executive of these figures may be briefly summarized as follows:—

1. He has a control over the operations of the business he can gain in no other way.

2. The budget system presents a co-ordinated plan of operation for immediate future.

3. The cost system reveals the actual results while operating under the budget.

4. Every officer and executive of the company from the president to the foreman is able most intelligently to plan and conduct his work.

Judging from my experience in reviewing firms which have become involved in financial difficulties, it would not be any exaggeration to say, that if cost accounting and budget systems were generally introduced into business at least 50% of the failures, apart from dishonest failures, could be avoided.

THE TREND OF PRODUCTION COSTS

THE Dominion Bureau of Statistics index number of commodity prices, with 1926 as the base period, declined from 76.7 for January to 76.0 for February. The main groups compare as follows:

	Feb. 1930	Jan. 1931	Feb. 1931
Foods, beverages and tobacco	103.0	79.9	78.4
Other consumers' goods	89.4	82.9	82.4
All consumers' goods	95.0	81.7	80.8
Producers Equipment	96.2	91.5	91.3
Building and construction materials	96.7	84.0	83.6
Manufacturers' materials	90.4	64.4	64.0
All producers' materials	91.5	67.9	67.5
All producers' goods	91.8	70.3	69.9
All commodities	94.0	76.7	76.0

The most important reductions in February were in the following: Foreign fresh fruits, furs, hides and skins, live stock, meats and poultry, fats, eggs, sash cord, silk (raw), wool yarns, wool cloth, scrap iron, silver. The most important advances were in the following: Fresh domestic fruits, grains, raw cotton.

Sales Book Production Costs

By G. S. N. GOSTLING, A.C.I.,
Western Sales Book Company, Ltd., Winnipeg.

(Before Winnipeg Chapter, October 20, 1930.)

WHEN I accepted the invitation to read a paper before this meeting, I did so with a feeling of considerable trepidation. I am not an expert cost accountant and anything that I can say will, I am afraid, seem very elementary to you. Mr. McVey suggested that I speak on the subject of "Sales Book Production Costs," by which I know he meant a description of *how* we find out what our costs are, rather than what they are.

In our factory we specialize in the manufacture of continuous stationery and manifolding books. Most of the members of an organization such as this will be familiar with continuous stationery which is being more widely used every day because of the tremendous increase it effects in production of multiple part forms, either hand written or typewritten. Manifold books are also widely used and in their commonest form are known as counter check books, counter sales books or simply sales books. Sales books are the books used by practically every store, from the corner grocery to the large departmental store. In addition, there are many different styles of manifold books used for all kinds of purposes, such as writing invoices, delivery slips, purchase orders, salesmens' order books, etc.

General Problems

While our system of recording costs is similar in some respects to that used by many other printing establishments, and to the standard cost finding system advocated by the United Typothetae of America, nevertheless we have some problems which are different from those of the ordinary "job printer." The similarity of all "sales books" for example, permits of a certain degree of standardization—which, thanks to modern automatic machinery, makes it possible to enjoy some of the advantages of mass production. This, in spite of the fact that every order is individual and printed to a particular customer's requirements.

My idea for to-night is to try and give an outline of how we arrive at our costs, what information we want from our figures, and the use to which it is put.

I have already mentioned that each order we receive is a special order and different in some respects from any other order. This means that we have to have job costs.

A separate sheet for each job is made out on a continuous billing machine at the same time as the factory order, acknowledgment for the customer, salesman's commission copy and several other copies for different departments, including a 5 in. x 8 in. card showing all important details which is placed in an alphabetical file.

The cost sheet for each job shows the materials used and total of labor and burden, thus giving the total cost of the order.

How is the information on these cost sheets arrived at?

We will take the different divisions of cost and consider them each in turn. Cost may be divided into two main divisions:

One—Manufacturing cost.

Two—Commercial cost, i.e., general administrative and distribution (selling) expense.

Separating the manufacturing cost, including manufacturing burden, from other expense gives a closer check on each of the two divisions. We will consider first the manufacturing cost.

Printing processes lend themselves very nicely to the gathering of comparatively accurate manufacturing costs, for the reason that it is a simple matter to follow the progress of any order through the different stages of manufacture. These different stages are quite distinct and for cost purposes form well defined departments. If we can arrive at a basis for charging for the work put in on an order in each of the different departments, we shall be well on the way towards knowing our manufacturing cost.

Our basis is the time spent in productive work on a job by each department, and unit of time is the hour. Consequently, we speak of the hour rate of the department which is the cost of performing one hour of productive work in that department.

Examples of the different departments are as follows:—

Composing Room (typesetting).

Stereotype Department.

Press Department (each different printing press, or type of press, is considered a separate department).

Bindery Department (two bindery departments, one for hand work and the other for stitching machines).

Shipping Department (not considered as part of manufacturing cost, but included in the distribution (selling) expense).

The above are, of course, only some of the departments. They are the main ones which an order for sales books will pass through on its way to the shipping room door, and are arranged in the order in which the work is routed from one department to another. There are in addition separate departments for slitting rolls of paper, carbonizing paper, etc.

Hour Rates

Hour rates include labor and burden and therefore consist of all the elements that enter into the manufacturing cost except materials. They may be machine hour rates, or man hour rates, depending on the type of work performed by the department. If the man is the dominating factor of production as, for example, typesetting by hand, then the rate for that department is a man hour rate. If the machine is the dominating factor, such as the press on which the printing is done, then the rate is a machine hour rate.

In order to take the first step in arriving at the hour rate we need that fundamental of a cost system—a well arranged payroll which must provide a total by which labor can be paid, and also apportion the amounts earned so that each department will be charged

with its proper share. The sources from which the payroll is assembled are the time tickets. Each employee has a weekly ticket which is punched in the time clock on commencing and finishing work. This is the basis on which they are paid. In addition each operative completes a daily time ticket on which is shown information as to the serial number of the job or jobs worked on during the day, and the length of time spent on each job. Different departments, and operations within the departments, are indicated by symbols. The total time accounted for by the daily time tickets is balanced each week with the weekly tickets, and a summary prepared distributing the charges to the various departments.

The charges are not only distributed to different departments, but are further split into chargeable (or productive) time and non-chargeable time. It is evident that a paricular job should be charged only for work that is definitely performed in connection with that job and no other. Time lost in waiting for something to do is not chargeable to any particular job, but must be due to inefficiency or perhaps lack of sufficient volume, but in either case the cost must be spread over the whole department. Likewise cleaning the department and many other operations causing time lost to actual productive effort.

The different departments in the cost record are charged with all labor both chargeable and non-chargeable, that portion of the factory burden which can be definitely assigned to the various productive departments, and all direct charges which can be properly allocated to each department. The items of manufacturing burden which are charged to the departments and the basis on which they are distributed are as follows:—

Rent (includes heat)—According to ratio of floor space taken up by department to total floor space.

Light—On same basis as rent.

Power—According to the ratio of H.P. of motors in each department to total H.P. of all departments.

Non-Chargeable Time—Distributed from the payroll as mentioned.

Repairs and Maintenance—Direct charges for repairs in different departments.

Taxes and Insurance—According to ratio of value of equipment in each department to total value of plant. Values of each department are taken from the plant ledger.

Depreciation—Same as taxes and insurance.

Workmen's Compensation—According to payroll.

Sundries (including general supervision, etc.)—Distributed by means of a separate department. Is spread over the "productive" departments on a basis of chargeable hours. Further reference to this later on.

You will note that we do not include any allowance for interest on investment. It is our feeling that this is not an item of cost but is properly taken care of in the profit margin. This is a controversial subject, I know, and some compare the charge for interest on investment to the provision for depreciation. There is a very distinct dif-

ference, however. Depreciation represents actual disbursements that have been made. It is only spreading over a comparatively long period the cost of certain assets which are necessary to the carrying on of manufacturing operations, in much the same way as insurance and taxes, etc., are spread over a period. Interest on investment, however, represents dividends that will be paid on the investment, if they are ever earned, or may be considered as the loss of interest which might have been earned if the money had been otherwise employed.

Returning to the hour rates, it will be noted that all of the elements of manufacturing cost which can be properly charged to the different well defined departments have been taken care of, but there are still a number of "odds and ends" which have to be included some where. We group these into a separate department which we call "General Factory Overhead". This includes general supervision (that which is not entirely devoted to one or two departments), wages for cleaning, rent and light for passageways, and similar items. The total of the "General Factory Overhead" is distributed over all the "productive" departments on a basis of the number of chargeable hours worked in each department.

The total of all charges to the various departments, equal the total manufacturing cost for the period, excluding materials used. The total of each department is divided by the number of chargeable or productive hours worked in that department, thus giving the hour rate which we have already defined as the cost of one hour of productive work.

Factory Burden

I have remarked that I think our business lends itself to figuring of accurate manufacturing costs. It follows, therefore, that if this is true our manufacturing burden must have been equitably distributed to the cost of each job.

Most items of factory burden have a distinct time element. For instance: Wages for non-chargeable labor are based on time. Insurance, depreciation, taxes, etc. are all based on time—one-twelfth of the total for the year being charged to cost each month. Rent, light and power all have a time element. I am emphasizing this time element of factory burden because it will be noted that in the application of our hour rates to the determining of manufacturing cost, the overhead charges absorbed in the hour rates will have been distributed to each job on a time basis.

Having ascertained our hour rate and knowing, as we do from the time tickets, the length of time worked on a job in each department, we only need to know the cost of materials in order to arrive at the manufacturing cost. We will then pass on to consideration of the material costs.

Material Costs

We estimate the materials on our orders except in special cases where a single order if of sufficient importance to warrant keeping a special record. The production of the orders is planned in advance and orders of similar specifications are grouped together and all manufactured at one time. The number of such orders that can be grouped

together depends, of course, on the size and the capacity of the press on which thew are to be printed. A very simple illustration would be a "group" of four orders of such a size that two of them could be printed side by side on the press at the same time. Supposing one of the orders to be for 1,000 books, one for 500 books and two for 250 books. One half of the cylinder of the press would be used to print the order for 1,000 books. On the other half of the cylinder would be printed in turn and at the same time as the order for 1,000 books, the remaining three orders for 500 and 250 books in turn. This effects a lot of economy in manufacture which may not be evident unless you are familiar with printing processes—less time for making stereotype plates, less time in making-ready the press for printing each order, etc.

This grouping of orders means that several jobs going through the press at the same time are printed from one roll of paper which makes it necessary to estimate the materials entering into each of the different jobs.

Perhaps I should mention here that when a pressman is running a group of orders, he shows the number of all the orders on his time ticket and the total time worked on the group is divided among the different orders of the group according to the number of books. As far as the materials are concerned, it is a comparatively simple matter to estimate the quantity in a given number of books—that is, the actual amount which is in the finished product. The total area of paper in the order can be computed and by having tables showing the weights of different grades of paper to a given number of square inches, the materials can be easily calculated. Such comparatively small items as ink, stitching, wire or glue, etc. are included in the hour rates of the different departments in which they are used.

Waste

Estimating the materials used on a job as above doesn't take care of the biggest problem which is waste. Waste is a very important subject indeed, and being to a certain extent controllable, it is a subject to which is given a great deal of attention. There is a certain amount of waste on every job and this has to be added to the estimated amount of materials in the finished job.

We are continually striving to minimize the amount of waste in our plant and everything to this end is done. Grouping of orders assists materially as there is less waste on a long run than on a short run. The different sizes of forms are manufactured on presses which will most economically accommodate those sizes. Efforts are made to standardize on sizes which are economical to manufacture and the advantages are passed on to the public in the form of lower prices for standarized products. These advantages to the purchaser in turn stimulate a greater volume of the standardized books which still further assists in economical production.

Every month all waste is carefully collected and weighed and a percentage to the total materials used, as arrived at by the monthly inventory, is calculated and closely watched each month.

For cost finding purposes, this does not help very much as there is a very great difference in the ratios of waste in the different groups and classes of jobs. Fortunately, however, the amount of waste for

each different class of work and the different quantities remains fairly constant. By making tests, we have discovered the waste ratio of all the different groups including the variations between orders of different sizes. These ascertained ratios are taken as standards and periodical tests of the different groups are made to see that we are keeping in line.

To complete the charge for material on each cost sheet a small percentage is added to the estimated total materials used, including waste. This percentage represents the cost of stock handling and to arrive at by accumulating the different charges as a department and ascertaining the ratio of the cost of the department to the total materials used.

Inventory

In discussing material, I mentioned that for balance sheet purposes or for operating statement purposes, we arrive at our total of materials used by means of monthly inventories. As I think inventories will be a subject of interest to the members, I will touch briefly on some of our experiences in this connection.

Even in a plant as comparatively small as ours, it is a costly business to take a complete physical inventory. On the other hand we must have a reasonably accurate figure for our stock at the end of each month as we compile complete manufacturing statements and balance sheets every month. It has been our practice to take physical inventory every three months and on occasion even oftener, relying in the intervening months on card inventories for the larger items, physical inventories for other items which fluctuate considerably, and estimates of stock on hand for those items which remain fairly constant. We would like to have matters arranged so that it would only be necessary to take a physical inventory every six months, and with this end in view have been studying our inventories for some time. From these studies we find that we can expect to get reasonably accurate results from a perpetual inventory covering our roll stock—practically all of our paper is received in carload lots in large rolls—but that perpetual inventories would not be feasible for the balance of the items.

In our large factories it has been found possible, after careful analysis of the inventories for a considerable period of time, to take the stock on hand of these other items as fixed—thus charging to cost each month's purchases. This appears to give satisfactory results where production is such that a few hundred dollars will not affect the percentages. For a smaller factory this leads to too many fluctuations in the material ratios as it is not always economical to purchase these smaller items in quantities that will be sufficient for one month's production. Purchases of several months' supply are made at a time, which if charged to cost when received would give a materials used figure for that month out of all proportion. In order to get away from this and still avoid the necessity of taking a physical inventory, we find it much more satisfactory to use an estimated figure of the quantity used for these items. This figure is based on the ratio of the items of production which we know from past experience. All differences are automatically adjusted when a complete physical inventory is taken.

The card inventory of roll stock is kept by a duplicate label system. On arrival of each shipment of paper, a duplicate numbered label is made out for each roll showing the date of shipment, grade of paper, etc. One copy of the label is pasted to the wrapper of the roll and the other is filed in numerical order. As a roll is taken from stock the label is torn off the wrapper and sent to the office, where it is matched up with the original which is removed from the file. The labels in the file at any time represent the stock on hand. The information from the labels is transferred periodically to the cards.

Administrative and Distribution Burden

The cost of administration and distribution, or selling expense, is the second of the two main divisions of cost. We have not as yet paid the same attention to breaking down this division as is done in the case of manufacturing cost. Of course, the ratios of selling expense and administrative expense to shipments are watched very closely, and both are analysed in the monthly financial statements.

We have made special analyses of selling expense, breaking down the total into the cost by territories, for business received from urban districts as compared to rural districts, orders taken direct by salesmen and those received by mail, etc. For the purposes of this paper I shall confine myself to discussing the application of this overhead to the individual jobs in our cost records.

The difficulty is to find a fair basis on which to distribute this burden to the different jobs. A lot of work could be done in investigating this matter, and it would be of interest and value to know the cost for the different classes and sizes of orders. For a rather obvious example—the difference in cost between obtaining an order by mail and one taken direct by a salesman. We do have some idea of the relative advantages, but only as far as certain items of the cost are concerned. Then, of mail orders some are received unsolicited and others as the result of specially directed effort.

It seems that there would be an almost infinite number of variations which would have to be considered with each order, making the calculation of the cost an excessively complicated task. The fairest way would appear to be to divide the orders into logical groups according to the method of selling and handling them.

We do not exactly do this (although it will be seen later that we do make some distinctions, particularly as regards commission rates), but distribute this overhead to all orders on the same percentage basis, whether large or small, received by mail or otherwise.

The amount to be added to each job is figured as a percentage of the manufacturing cost. By figuring it this way and not as a percentage of the selling price, it simplifies estimating on special orders and also ensures that the order taken at a reduced margin of profit bears a fair share of burden in proportion to the intrinsic value of the job.

The question also arises as to whether or not the large and small orders should all bear the same proportion of overhead. It may take no longer to handle the administrative end of a large order and it might even have been obtained with considerably less effort on the part of the sales force. All of this and much else may be true, but

generally speaking more than usual effort is put forth to obtain and retain large accounts.

Apart from the question of size of orders, however, we do differentiate between the individual jobs inasmuch as the overhead figure does not include such items as commissions, shipping cases and cartons (orders are packed differently according to method of shipment), special outward freight items, etc. Commission at the varying rates is charged according to the commission schedule, shipping supplies are included in raw materials. The subtraction of these items, of course, narrows the margin for error in the overhead figures.

As there is an admitted margin of error in the method of distributing the overhead charges, it may well be asked why bother? Why not stop at the manufacturing cost which can be more definitely determined?

Well, a lot of cost work depends on estimates but that doesn't make it valueless. An intelligent estimate has real value. As far as we are concerned, we have to have *some* basis for including this large item of the cost of the marketed product in order to estimate selling prices, particularly on special jobs where the price is not always determined by competitive consideration, and if so determined so that we may know if we can profitably handle the business. Then, also, we wish to make comparisons between the different classes and groups of orders as to the respective profit margins on the selling prices.

We think that for our business, the method we have adopted is reasonably accurate, and certainly when comparison between different groups is under consideration, will not be far out; bearing in mind that our different classes of orders are all obtained and handled in a similar manner and the total of the different classes would be made up of orders of all sizes which would average out fairly well, one class with another.

Figuring the Cost of a Job

Before each job docket goes to the factory for manufacture, the cost record sheet is removed and placed on a file with the cost clerk, in numerical order.

As the job progresses through the factory the time spent on it is recorded on the daily time tickets by the operatives in the different departments. These times are all posted daily to the different cost sheets according to the number of the jobs.

On completion of each job the docket is returned to the office and the invoices are made out on special continuous forms used in an ordinary typewriter. In one operation we make up six copies of each invoice—one for the customer, one as a statement, one for the accounts receivable, one for the consecutive number file, one for salesman's commission file, and one for the salesman. The cost clerk removes from his file the sheets covering all completed jobs, fills in the departmental hour rates and extends the cost for each department. Materials are estimated as explained and to the total of departmental and material costs are added the figures for administrative and selling overhead, commission, and freight, if any. The resulting cost is deducted from the selling price and a note made of the margin between the two.

Goods in Process

At the end of each month goods in process are included in the manufacturing statement at manufacturing cost.

As the cost sheets for all completed orders are removed from the file, it follows that at the end of each month the sheets still on file represent the work in process in the factory. The value of this is determined by multiplying out all times posted by the hour rates and totalling the extensions. To this total is added the estimated materials in those jobs which have arrived at a stage where the material element has to be taken into consideration.

General

I am going to pass on to a few general remarks in amplication of some of the matters I have touched upon.

While our cost records are set up for individual job costs, we do not cost every order. All times are posted so that we can at any time complete the record for any particular job. Ordinarily, however, we complete the costs of *all* special jobs. In addition, it has been our practice to complete the costs every month of different standardized groups. We have a regular schedule, certain groups each month until all have been completed and then back again to the first group. The total costs of the individual jobs comprising the groups are averaged and compared to past performances or other standards. As the selling prices of these groups have already been fixed our chief need is to see that the costs do not get out of line and that the trend is in the right direction. Any serious differences are investigated.

The costs of all the special orders are compared to the estimates and any differences examined, and if the fault of the estimating department, drawn to their attention. This makes for increased accuracy in our estimates.

Considerable other information which tends to better control is made available by our cost records. For instance, the ratio of productive to non-productive time, which is a matter of considerable significance. The hour rate and method of estimating materials are essential for estimating prices to be quoted on special jobs.

As I have not made reference to any controlling accounts in our general ledger, you will have concluded, quite correctly, that our costs are not tied in with our general accounts. Nevertheless, we do not go along blindly, without checking our cost figures with those shown on the manufacturing statement. I have already mentioned that the costs of the different groups are compared with standards, and those of special orders with the estimates. These are not the only checks—the hour rates themselves are checked by means of a monthly reconciliation statement in which the rate for each department is multiplied by the number of productive hours and the sum of the totals for all departments compared to the manufacturing cost as shown in the manufacturing statement. The differences are reconciled by adjusting for known items which are in the costs and not in the manufacturing statement and vice versa. Examples of such necessary adjustments would be small items of materials used, such as sitiching wire and ink, which are included in the hour rates—differences in the

amount of depreciation charged in hour rates and the actual amount provided for, etc. We find that our results can be reconciled to within a very few dollars each month.

In this paper I have tried to give a picture of our system. Of necessity, there are a good many interesting features I have not touched upon. It is necessary to draw the line somewhere and I think I have gone over the main features. If anything occurs to you about which you would like further information, I would be glad to try and answer any questions.

Before concluding, I wish to thank you, gentlemen, for an opportunity which has been of greater benefit to me than to you. I wish that the transaction had not been so one-sided and I had been able to give greater value in return for you patience.

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Sales Statistics

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(Before Hamilton Chapter, March 11, 1931.)

IN commencing to treat the subject of Sales Statistics and its relation to modern business, we must first realize that the days of guess work and reckoning have passed. In every department of business to-day men have ceased to act upon guesses of any nature. The intensive selling efforts of the day demand the most efficient aids and in critical times, the management must have accurate records produced with all possible speed.

Business is exposed to perils which the uninformed executive cannot foresee. Sometimes he does not even suspect their existence until they have overwhelmed him. This condition can only be corrected when the executive secures the actual facts regarding his business and then makes proper use of these facts. During recent years, manufacturing organizations have made considerable progress in the reduction of manufacturing costs by the securing of proper information. It is generally acknowledged that we have many of our plant problems answered and that distribution now needs the same type of treatment. The proof, of course, is that in practically every business, selling costs increase in percentage as volume goes up, and manufacturing costs go down as volume goes up. The management then, has reduced manufacturing to a science where most improvements are details, rather than basic principles, but sales are a long way from this point of efficiency.

Importance of Sales Costs

In their anxiety to secure a national distribution, many companies have paid too much attention to increased sales volume and too little attention to the cost of securing this volume. New products have been added to the line, new warehouses built to render better services, new markets (often highly competitive) have been entered, all with the thought of increasing sales. Although in many instances this policy has increased sales volume and has meant increased profits, there are still many other cases in which it has meant a decrease in profits.

In determining sales policies, the executive of every business should have accurate, timely reports, revealing the actual trend of business. A thorough knowledge of distribution demands complete and accurate analyses, reavealing:

What was sold.
Where it was sold.
Who sold it.
Who bought it.
How it was bought.
What was the profit.

In order to properly supervise a sales force, an accurate analysis must be made of the activities of each representative. How much are

they selling? Are they selling the most profitable lines or are they following the line of least resistance and just "taking orders"? Are they making their monthly quota of business?

It is also vitally important to study a detailed product analysis.

Customer analysis is another very important angle from which sales must be studied. This tells us who is buying from us and whether we are increasing sales to each customer, or whether customers are purchasing elsewhere. This report will also answer questions as to the customers buying the full line—distinguishing profitable customers from unprofitable ones.

"Punched Hole" Methods

It is my purpose to-night to tell you of a modern, efficient method of securing these figure facts pertaining to sales. The method I refer to is known as the "Electric Tabulating and Accounting Machine" or "punched hole" method.

I shall now just briefly refer to the origin of these machines. The inventor, Dr. Herman Hollerith, won early distinction as a statistician and recognized the need for a mechanical method for census tabulation, following the compilation of the United States census of 1880. Dr. Hollerith developed a system of recording descriptive data for each individual or each unit of entry by punching holes into strips of paper and later into cards, which could be used to control electrically operated mechanism in the form of counting or adding devices.

The first practical use of these devices was the tabulation of mortality statistics in the City of Baltimore.

At the beginning of the eleventh census in 1890, a commission of three expert statisticians was appointed to make a test of all available systems for tabulating such data. A report showed that the punched hole method was more rapid than any other and that the accuracy of it placed it far ahead of all others. As a result of this report, Dr. Hollerith's method of tabulating was selected to compile the returns of the eleventh census of the United States.

The method proved a marked success and other governments then used them for census tabulation.

During the taking of the eleventh census, the need for some machine or devcie to aid in the audit of railroad freight accounts was brought to the attention of Dr. Hollerith. Experiments were carried out at the offices of the Auditor of Freight Accounts of the New York Central Railroad. The test proved that special work could be done to advantage by this method. In the application of the method to railroad accounting, changes were necessarily made in the equipment to provide means of recording amounts and other information. Since that time, tabulating machines have been constantly improved until to-day, practically every branch of industry and government institution is able to use them and derive benefit from them.

It will probobly interest you to know that the inventor died only a little over a year ago in the City of Washington. Although he had ceased, many years ago, to actively interest himself in the business, he did live to see his invention used in over sixty countries of the world and in a large majority of government institutions.

How It Works

I shall briefly outline the principle of electric tabulating machines.

Codes are originally set up as a means of recording data on tabulating cards. All information must be reduced to numerals, since tabulating machines record or add numerals only, so that all names, descriptions and symbols must be expressed in such terms.

There are many methods of assigning numbers for illustrating statistical and accounting data. Numerical codes are the most concise and positive means of indentifying the names of accounts, articles, departments, geographical divisions and other classifications.

Large companies have long realized the many advantages of using numerical codes and to-day almost everything in connection with the manufacture of a product is assigned a number. Codes are more easily remembered than names and save much time.

The basis of the tabulating machine method is the tabulating card. The card forms are designed for a particular business after a careful study of the requirements. Provision is made on the card for recording such information as is necessary, in order to secure the variety of reports desired from the tabulating machine.

There are two sizes of cards, one having 45 columns and the other 80 columns. The actual dimensions of both cards are the same, but the spacing of columns is different. The card is divided into fields, which means the allocation of one or more columns for a particular classification. Various colors and combinations of cards are used, each of which may be printed with an endless variety of fields and headings, with combinations of columns suitable for the intended purpose.

The initial proceeding is that of punching a card. The key punch is arranged with keys 0 to 9 and automatically spaces from columns 1 to 45 (or to 80) immediately following the punching of each hole, somewhat similar to a typewriter. A good operator can punch 2,000 cards in 8 hours, and an expert over 2,500 cards. Each card may contain approximately from 5 to 30 classifications of information. It is obvious that no such amount of work could be done by hand posting on sheets or books of record in a similar length of time.

To ensure absolute accuracy, the punching is verified. There are several methods of verification, the most used being the verifying key punch. This machine is somewhat similar to a key punch, but does not punch holes in the card. If an error has been made, the machine stops. The operation of this punch is based upon the theory that two operators will not make the same error in transcribing the original record to punched cards. The cards are generally balanced to a predetermined group total.

The next operation is the sorting of cards. This is done an an electric sorting machine. This machine sorts cards into sequence of desired classes at a speed of 400 cards per minute. It is on this machine that the cards are placed in sequence of salesman, province, customer, product or any other desired class.

The final operation is that of tabulation. The printing tabulator is used to list details from individual cards or to add, accumulate and print classification, totals and accumulated totals.

This machine operates at a speed of 150 cards per minute while adding, controlling and printing. It is possible to make 6,000 additions per minute on the tabulating machine. The speed is 75 card per minute when listing every card.

The cards are placed in a hopper and are automatically fed through the machine. Reports may be taken from the printing tabulator on rolls of paper or on ledger sheets. It is fully automatic, in other words, when all cards of a class have passed through the machine, it automatically stops, clears the counters (printing the totals) and then continues on with the next group.

Suitable switches permit of the taking of page totals and the carrying forward of the amounts to the next page. Such totals are carried forward cumulatively, until the counters are finally cleared, after all cards have been run through.

There are several types of tabulating machines, listing and non-listing, but I have described in detail the latest developments in tabulating machines.

Tabulating machines are economical because of the speed of operation. They are accurate, since punched cards form an unalterable permanent record. They are exceedingly flexible and may be applied to a variety of accounting work, including payroll preparation, labor distribution, accounts payable, accounts receivable, stock records, inventory, material distribution, employment records, income tax, production records, etc.

New machines are constantly being developed and it is altogether likely that the next few years will see many remarkable additions to the existing machines, making possible new and added applications.

Two Examples

I have distributed tabulating cards used by two large Canadian companies for the purpose of securing their sales statistics. I shall briefly outline the use of tabulating machines in these concerns.

The first is a large retail jewelry company. The cards are punched from copies of sales slips which are filled out by the sales clerks in the store. Codes of sales person, branch, commodity and department are noted on slip by sales clerk. At the close of each day, all sales slips are forwarded to the Tabulating Department. Cards are punched, balanced and filed away until close of period, when they are sorted and tabulated.

The reports, secured weekly and monthly, include the following:

Sales by commodity.

Sales by sales person.

Sales by department and commodity.

Sales tax report.

The sales analyses for all branches from coast to coast are handled in the same manner and all on one set of machines at the home office in Montreal.

The installation has proven highly effective and has furnished the management with prompt, accurate information relating to all phases of their selling organization. It has also proved to be more economical than the former method and has made possible the centralization of statistical work previously done at the branches.

The other tabulating card which you have in your hands is used by a large manufacturer and distributor in Toronto. You will notice that this card is an 80 column one. The card is so designed that it may be used twice for reasons of economy.

At the time the original installation was made, an analysis by major commodity groups was considered sufficient. Following the successful application up to this point, it was decided to extend this breakdown still further and also to secure a cost of sales. Accordingly the 80 column card was designed and the proper equipment installed.

The field comprising columns 34 to 40, cost and unit of cost respectively, are punched only in the master cost card, one of which having been established for each commodity. There are approximately 8,000 master cost cards sorted by commodity with the detail sales card in the preparation of a cost of sales report, prepared monthly.

Following a tabulation in this order, one extension only is necessary to complete the cost of sales report, and this is done on a posting machine. In this manner it will be seen that we have eliminated the task or costing each item of each invoice.

We have evolved a method in connection with our cost of sales report, which I should perhaps explain, to answer a question frequently asked. To eliminate superfluous master cost cards for which there are no supporting sales cards for a particular period, we have a device attached to our sorter, which in reality functions as an auxiliary sorter brush. Upon completion of our regular commodity sort, in which our master cost cards are included, one additional sort with this auxiliary or elimination device operating, will direct all master cost cards that are not supported by one or more detail sales card to the reject pocket of the sorter. This sort does not disturb the sequence of our previous commodity sort and, of course, reduces a possible maximum of 8,000 master cost cards, leaving only active cost cards to pass through the tabulating machine.

The above report is, of course, one of the most important in their progress. The following tabulations are also prepared as a part of a sales analysis breakdown:

(1) Sales analysis by salesmen with a breakdown by commodities and values.

(2) Sales analysis by plants.

(3) Sales analysis by license holders and non-license holders.

(4) Sales analysis by retailers and jobbers.

(5) Sales analysis by major commodity groups.

CHAPTER NOTES

MONTREAL CHAPTER ANNUAL MEETING

At the annual meeting of Montreal Chapter, held on March 19, the following officers and directors were elected:

Chairman—R. W. Louthood, Beauharnois Power Corporation, Ltd.; Vice-Chairman—J. P. Masterson, Canadian Industrial Alcohol Co., Ltd.; Secretary—R. Schurman, C.A., R. Schurman & Co.; Treasurer—L. Rhodes, Consolidated Lithograph Mfg. Co., Ltd.

Directors—H. W. Blunt, C.A., A. K. Fisk, Skelton & Co.; A. Broomer, C.A., The Robt. Mitchell Co., Ltd.; L. N. Buzzell, C.A., Clarkson, McDonald, Currie & Co.; H. Douglas, Federated Press, Ltd.; P. E. Dufresne, Wilson & Fessenden; S. Farquharson, Farquharson & Associates; E. J. Loiselle, Canadian International Paper Co., Ltd.; D. R. Patton, C.A., Stanford's, Ltd.; J. P. Rolland, Rolland Paper Co., Ltd.; P. W. Wright, Shawinigan Engineering Co., Ltd.

Representatives on Dominion Board—L. Belanger, C.P.A., 1527 Crescent St.; G. T. Bowden, The Steel Co. of Canada, Ltd.; G. C. Leroux, C.P.A., Ass't. Inspector of Taxation; L. A. Peto, Canadian Car & Foundry Co., Ltd.; Prof. R. R. Thompson, M.C., V.D., A.C.A., C.A., McGill University.

TORONTO CHAPTER ANNUAL MEETING

At the annual meeting of Toronto Chapter, held on March 18th at the Carls-Rite Hotel, the following officers and directors were elected:

Chairman—K. A. Mapp, F.C.A., Henry Barber, Mapp & Mapp; Vice-Chairman—W. M. Lane, Lever Bros., Ltd.; Treasurer—J. W. Spence, Canadian Kodak Co., Ltd.; Secretary—E. W. Carpenter, DeForest Radio Corporation, Ltd.

Directors—F. E. Brooks, Canadian National Carbon Co., Ltd.; F. P. Higgins, F.C.A., Fred Page Higgins & Co.; B. W. Lang, Goodyear Tire & Rubber Co. of Canada, Ltd.; W. A. McCaffrey, Office Specialty Mfg. Co., Ltd.; R. Oaten, Gurney Foundry Co., Ltd.; C. H. Pelling, C.A., Clarkson, Gordon, Dilworth, Guilfoyle & Nash; G. A. Phare, Rapid Grip & Batten, Ltd.; R. Presgrave, York Knitting Mills, Ltd.; H. A. Shiach, F.C.A., Rutherford Williamson & Co.; E. E. Sparrow, Imperial Varnish & Color Co., Ltd.; R. F. Bruce Taylor, C.A., Edwards, Morgan & Co.

Representatives on Dominion Board—H. E. Guilfoyle, F.C.A., Clarkson, Gordon, Dilworth, Guilfoyle & Nash; G. H. Houston, Rolph-Clark-Stone, Ltd.; T. S. Jardine, United Drug Co., Ltd.; G. M. Mulholland, F.C.A., Thorne, Mulholland, Howson & McPherson; R. Oaten, Gurney Foundry Co., Ltd.; J. Turner, C.A., T. Eaton Co., Ltd.

CENTRAL ONTARIO CHAPTER ANNUAL MEETING

At the annual meeting of Central Ontario Chapter, held in Galt on March 12, the following officers and directors were elected:

Chairman—G. Earnshaw, Guelph Carpet & Worsted Spinning Mills, Ltd., Guelph; Vice-Chairman—C. J. Heimrich, Cluett, Peabody & Co. of Canada, Ltd., Kitchener; Secretary-Treasurer—C. R. Dorschell, Babcock-Wilcox & Goldie-McCulloch, Ltd., Galt.

Directors—C. T. Black, Canadian General Rubber Co., Ltd., Galt; W. L. Jardine, Clare Bros. & Co., Ltd., Preston; E. J. Miller, Globe Furniture Co., Ltd., Waterloo; E. R. Scott, Babcock-Wilcox & Goldie-McCulloch, Ltd., Galt; E. Tailby, L.A., Canadian Bank of Commerce Chambers, Kitchener.

CENTRAL ONTARIO CHAPTER

Report by C. J. Heimrich, Secretary-Treasurer, for year ending February 28, 1931.

During the term just ended, we held seven meetings, commencing with the annual meeting and dinner at the Walper House, Kitchener, on March 13th, 1930. At this meeting the following directors were re-appointed: Chairman—E. Tailby, L.A.; Vice-Chairman—G. Earnshaw; Secretary-Treasurer—C. J. Heimrich, L.A.; Directors—C. T. Black, E. J. Miller, A. H. Schlegel, and E. R. Scott; Auditor—C. V. Kidd, C.A.

Our speaker was J. E. Carruthers of Durant Motors, Toronto, his topic being, "Costing in Relation to Export Business." This marked our final meeting for the spring season.

The fall campaign opened by joining with Toronto and Hamilton in a regional meeting held at the Carls-Rite Hotel, Toronto, on October 1st, the speaker being a Central Chapterite, Harry F. Wilson, and R. W. Doering of Hamilton Chapter, who spoke on "The Industrial Engineer" and "Production Problems," respectively.

This was followed by another regional meeting at the Connaught Hotel, in Hamilton, on October 29th, when we again joined forces with Toronto and Hamilton Chapters as guests of the latter. The speaker on this occasion was Mr. Eric Camman of New York, who in a very masterly way gave the gathering something entirely different on "Standard Costs."

These two regional meetings were a great inspiration to all of us, and also showed us that we have a long way to go to measure up to the standard of our sister chapters in organization and numbers, the latter, however, being necessarily restricted by virtue of being situated in a less populous centre.

Our remaining meetings were staged in our own backyard, as follows: Nov. 20—Garrison Club, Guelph, speakers—Mr. S. E. LeBrocq and Mr. G. E. F. Smith of Hamilton; Dec. 11—Cluett Peabody Co., Kitchener, speaker, Mr. C. C. Hemmerich; Jan. 15—Kaufman Rubber Co., Kitchener, speaker, Mr. J. W. Spence, Toronto; Feb. 12—Globe Furniture Co., Waterloo, speaker, Mr. R. E. Love, Hamilton.

With one exception, all of the meetings have been well attended, the honors going to Guelph, when thirty-five were present, which is no

doubt accounted for by the well-merited reputation of our Guelph members as hosts. The average attendance, by conveniently eliminating the low-water mark of the December meeting, is about twenty-five, including visitors.

It may or may not be worthy of comment, that we have had each of our meetings in a different environment, and it likewise may or may not be only a coincidence that at these meetings some influences peculiar to the surroundings exerted themselves, at any rate. At the Guelph meeting held in the Armouries, we witnessed a contest royal between two gladiators of the science, Mr. LeBrocq and Mr. Smith. At the meeting held at The Cluett Peabody Company we tried unsuccessfully to "Collar" Mr. Miller and Mr. Earnshaw into admitting the merits of inventory control. At the Kaufman Rubber Company meeting we "stretched" our membership from twenty-two to twenty-seven by the addition of five new members. At the February meeting at the Globe Furniture Company the ecclesiastical surroundings filled one of our usually combatant members, when standard costs are mentioned, with a quiet tolerance that almost alarmed his friends. And to-night we are at The Goldie-McCulloch Company where we always feel "safe." This suggests that we exercise caution in our choice of places, as for instance, selecting a rope factory, or a glue factory, as we do not wish to either "hang" ourselves or get "stuck" with any of our problems.

The membership at the beginning of the year was twenty-three. There was one resignation, three lost their membership, and eight new members were added, making our present roster twenty-seven.

In reviewing the activities of our chapter for the year, I have been impressed by three noteworthy features:

1. The hearty support of the various manufacturers in permitting the use of their offices for our meetings.

2. The friendly co-operation of the members of other chapters in coming to our meetings to address us, in some instances in inclement weather and under inconvenient circumstances.

3. The indispensable assistance of our general secretary, Mr. McKague, in securing the services of these speakers for us. The assistance which Mr. McKague has rendered to us in this respect has completely solved our programme difficulties for us.

We very much appreciate the co-operation and assistance received from these sources, which has contributed in a large degree to any measure of success we may have attained. With a continuance of this support, and of the interest the members as a whole have shown this season, we have reason to feel that we will grow in numbers and in usefulness to the business community of which we are a part.

ACCOUNTANTS! NOTE

The Commercial Text Book Company would like to hear from Chartered Accountants who would be interested in preparing a short work of an educational nature for use in commercial schools. We have an outline of the work that would be required and we should be glad to discuss it with accountants to whom work of this nature would appeal. Compensation would be a fixed sum or on a royalty basis. Communicate with The Commercial Text Book Company, 383 Church Street, Toronto. Elgin 5007.